**Membrane Proteins**

**& Their Functions**

**Integral Proteins**

* penetrate the hydrophobic core of the lipid bilayer

* many are transmembrane proteins which span the membrane

* hydrophobic regions of an integral protein consist of one or more stretches of nonpolar amino acids usually coiled into an alpha helix

**Peripheral Proteins**

* not embedded in the lipid bilayer at all

* they are appendages loosely bound to the surface of the membrane

* often exposed to parts of integral proteins

**The Role of Membrane Carbohydrates in Cell-Cell Recognition**

* a cell's ability to distinguish one type of cell from another is crucial to the functioning of the organism
  + Ex) the basis for rejecting foreign cells by the immune system
* Cells recognize other cells by binding to surface molecules, often to carbohydrates, on the plasma membrane
* The carbohydrates on the extracellular side of the plasma membrane vary from species to species. The diversity of the molecules and their location on the cell's surface enable membrane carbohydrates to function as markers that distinguish one cell from another.
  + Ex) human blood types A, B, AB, and O reflect variation in carbohydrates

**Synthesis and Sidedness of Membranes**

1. The synthesis of membrane proteins and lipids in the endoplasmic reticulum. Carbohydrates are added to proteins, making them glycoproteins.
2. Inside the Golgi apparatus, the glycoproteins go through more carbohydrate modification, and lipids get carbohydrates, becoming glycolipids.
3. The transmembrane proteins, membrane glycolipids, and secretory proteins are transported in vesicles to the plasma membrane.
4. There the vesicles fuse with the membranes, releasing secretory proteins from the cell. Vesicle fusion positions the carbohydrates of membrane glycoproteins and glycolipids on the outside of the plasma membrane.